Test Methodology for Assessing Blunt Trauma Effects to the Skull Resulting From Non-Penetrating Ballistic Impacts to the Helmet

Overview:

State of the art lightweight ballistic protective military helmets can successfully defeat ballistic rounds. Most individuals however anticipate negative physical consequences resulting from the event. In reality, negative effects can be minimized. As future ultra light-weight protective systems evolve, an objective evaluation of any potential unintended consequences of the design need to be eliminated before fielding to the troops. A ballistic impact is a high velocity, ultra-short duration, low momentum event. This event occurs from 15 to 35 times faster than the low velocity, long duration, and large momentum event of an occupant impacting the interior of an automobile crashing at 60 miles per hour. Until now there has been no objective, bio-mechanically based, impact test method for correlating the forces of the ballistic event with actual expected injuries in humans.

Sensor Matrix

Description:

The Individual Protection Directorate of the Natick Soldier Center has focused on establishing a medically valid, objective test methodology for evaluating the potential for non-penetrating fracture of the skull due to the defeat of non-penetrating ballistic impacts to a protective helmet. A round is fired point blank at the helmet at the maximum, non-penetrating velocity of the fragment or bullet. Force data are gathered under the point of impact by sensors mounted on the Hybrid III head/neck form pictured here. The results are then compared to the values known to cause skull fracture due to ballistic impact and a risk of injury probability for the helmet can be determined.

With Skin and Helmet On

Status:

Currently operational for development testing of ballistic resistant military helmets.

Point of Contact:

Individual Protection Liaison

COMM: (508) 233-6481, DSN: 256-6481

E-Mail: amssb-rip@natick.army.mil

NATICK SOLDIER CENTER

Kansas St.
Natick, MA
01760
nsc.natick.army.mil

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